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## VISUAL-TALENT COVERAGE OF THE USSR IN RELATION TO SOVIET ICBM DEPLOYMENT

25X1D



CIA/RR-EIM-T1-60

11 JULY 1960

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FOREWORD

25X4D This report provides an estimate of the portions of the USSR that have been visually or photographically covered by Western intelligence sources during the period [REDACTED]. The extent of this coverage is compared with the total area of the USSR, with the total area considered suitable for long-range missile deployment, and with the area of those established priority regions that are believed to be most suitable for missile deployment. Similar comparisons based on railroad route mileage are also presented.

VISUAL-TALENT COVERAGE OF THE USSR IN RELATION TO SOVIET ICBM DEPLOYMENT

I. Summary

During the period [REDACTED] about 7.5 percent of the total land area of the USSR is covered by useable TALENT photography. Since about 45 percent of the terrain of the USSR is unsuitable for long-range ballistic missile deployment (especially for deployment of the first few units), a more meaningful statistic is the coverage of Soviet land area suitable\* for such deployment. About 13.6 percent of the suitable area has been covered by useable TALENT photography.

Eight areas\* (about 24 percent of the land area of the USSR) have been designated for priority search for deployed long-range ballistic missiles by the intelligence community. About 3.6 percent of the total of these areas is covered by useable TALENT photography.

The intelligence community has concluded that the Soviet ICBM system depends very heavily on railroad transportation; therefore, the portion of the Soviet railroad network covered during this period is probably the most meaningful statistic. Useable TALENT coverage of the total rail route mileage amounts to about 11.5 percent, or about 8.5 percent of such mileage in the priority areas. Over 35 percent of the rail route mileage in priority area 2 and more than 10 percent of priority areas 1 and 3 have been covered with useable TALENT. There has been no useable TALENT coverage of the other priority areas.

In addition to this highly reliable TALENT coverage, certain portions of the USSR have been subject to observation by other Western intelligence sources. Although some 4.5 percent of the total land area of the USSR was observable\*\* to these sources during the period, less than one percent of the area is estimated to have been observed\*\*. The estimated observed coverage of suitable areas by these sources is about 1.5 percent, and such coverage of the priority areas is about 2 percent. Roughly 35 percent of the rail route mileage in the total land area, suitable areas, and priority areas of the USSR was traveled during this period, and it is estimated that useable observations were made along about 7 percent of the rail routes in these areas.

\* These areas are presented on the accompanying map.

\*\* Definitions and method of calculation are presented below.

In conclusion, it is estimated that more than 85 percent of the suitable area, 95 percent of the priority areas, and 85 percent of the rail route mileage in priority areas have not been observed or covered by useable TALENT during the period. In view of the large areas still uncovered and the limited number of ICBMs that are likely to be deployed so early in the Soviet program, it is not surprising that none of these sites has been positively identified.

## II. Suitable and Priority Areas

The total area of the USSR suitable for ICBM deployment is estimated to be 4,764,000 sq. miles. The area considered unsuitable for ICBM deployment is 45 percent of the total area of the USSR (8,647,000 sq. miles) and includes areas of continuous permafrost, high mountains, marshes, swamps, open bodies of water, towns and cities. Because of difficulties of construction and logistics, it is unlikely that any of the earlier long-range missiles would be deployed in such areas; these areas might be used only for some of the very last missiles deployed, if at all. The area assumed as unsuitable for long-range missile deployment is shown in the accompanying map.

Within the USSR, eight areas have been recognized by the intelligence community as being of priority interest in the search for long-range missile launching sites. These eight areas are shown on the accompanying map.

The intelligence community has concluded that the Soviet ICBM system depends very heavily on railroad transportation. If the launching facilities are fixed, the railroad network is the primary means of logistic support; or if mobile, these facilities are rail mobile. For this reason, the coverage of the Soviet railroad network, primarily in the priority areas, is probably the most meaningful of the various measures presented in this paper.

## III. TALENT Coverage

25X1D The total area of the USSR covered by useable TALENT photography since [REDACTED] has been calculated as 650,000 square miles. In making this calculation, linear photo mileage obtained by the four most recent TALENT missions was multiplied by 55 miles considered to be the width of effective coverage. The resulting figure of gross square mile coverage was then reduced to compensate for varying degrees of cloud cover (heavy clouded areas were assumed to have yielded only 25% coverage and scattered cloud areas 75% coverage).

Table 1 presents data on the portions of the total area, suitable area and priority areas covered by useable TALENT during the period.

Table 1

Areas of the USSR Covered by Useable TALENT Photography

25X1D

Area	Total Land Area (Square Miles)	Estimated TALENT Coverage	
		(Square Miles)	(Percent)
Total USSR	8,647,000	650,000	7.5
Suitable for Deployment	4,764,000	650,000	13.6
Priority Areas			
Total	2,081,000	75,150	3.6
Area 1	467,800	10,750	2.3
Area 2	315,600	60,270	19.1
Area 3	170,700	4,130	2.4
Areas 4-8	1,126,900	0	0

Table 2 presents data on the portions of the rail route mileage covered by useable TALENT photography.

Table 2

Rail Route Mileage of the USSR Covered by Useable TALENT Photography

25X1D

Area	Total Rail Route (Miles)	Estimated TALENT Coverage	
		(Miles)	(Percent)
Total USSR	75,900	8,750	11.5
Suitable for Deployment	75,400	8,750	11.6
Priority Areas			
Total	46,000	3,910	8.5
Area 1	6,200	620	10.0
Area 2	8,300	2,950	35.6
Area 3	3,000	340	11.4
Areas 4-8	28,500	0	0



#### IV. Non-TALENT Coverage

##### A. Observable Area

Large areas of the USSR have been subject to observation by travelers from the West during the period [REDACTED]. The maximum area that could have been observed if ideal conditions prevailed -- that is, if there were absolutely no obstructions or limitations to vision along the routes traveled -- was calculated by multiplying the total route miles traveled by the width of the maximum observation belt. The observable belt for air travel is estimated to be 10 miles and for rail, water, and highway travel to be 5 miles. Table 3 presents data on the maximum observable areas for total USSR land area, suitable area, and priority areas.

Table 3

Maximum Observable Areas in the USSR

<u>Area</u>	<u>Total Area</u> <u>(Sq. Mi.)</u>	<u>Maximum Observable Area</u> <u>(Sq. Mi.)</u>	<u>(Percent)</u>
Total USSR	8,647,000	387,500	4.5
Suitable for Deployment	4,764,000	368,000	7.7
Priority Areas			
Total	2,081,000	220,800	10.6
Area 1	467,800	12,000	2.6
Area 2	315,600	33,000	10.5
Area 3	170,700	13,900	8.2
Area 4	195,600	58,200	29.8
Area 5	290,700	52,100	17.9
Area 6	469,800	39,900	8.5
Area 7	108,000	8,400	7.7
Area 8	62,800	3,300	5.3

##### B. Estimated Observed Area

The total area actually observed by travelers is estimated to be far less than the maximum observable area based on route miles traveled, for conditions for observations are frequently far from ideal. Limiting factors considered in calculating the actual extent of the area observed are as follows:

1. Visibility restrictions, including terrain, vegetation, rain, snow, fog, time of day (light or darkness), and man-made obstacles of various types.

2. Limitation of vision to one side of the vehicle (nullified somewhat if the route is frequently traveled; applies least to auto travel).

3. Limitation to air observation by altitude, cloud cover, and seat location.

4. Speed of travel (particularly by train), which limits the time span for recognition of features, thus reducing the width of the area that can be effectively observed.

5. Harassment by security personnel, which is particularly likely at points where sensitive installations might be observed.

In view of the above limitations, the area observed by travelers was calculated by multiplying the maximum observable area by an estimated percentage of effectiveness of observation. The fact that many routes were traveled a number of times is taken into consideration in determining the percentage of effectiveness. The percentages used to estimate the portion of observable area actually observed are as follows:

<u>Type of Travel</u>	<u>Effective Observation (Percent)</u>
Air	15
Rail	20
Water	10
Highway	35

The estimated observed coverage for each type of area under consideration is presented in Table 4.

Table 4

Estimated Observed Area in the USSR

<u>Area</u>	<u>Square Miles</u>	<u>Percent of Area</u>
Total USSR	71,900	0.8
Suitable for Deployment	68,700	1.4
Priority Areas		
Total	41,800*	2.0
Area 1	2,300	0.5
Area 2	5,800	1.8
Area 3	2,600	1.5
Area 4	11,900	6.1
Area 5	10,500	3.6
Area 6	6,500	1.4
Area 7	1,500	1.4
Area 8	600	1.0

C. Railroad Route Mileage Traveled

Table 5 presents data on the Soviet railroad route mileage traveled by Western observers during the period. The mileage traveled is also reduced for observational difficulties; to arrive at an estimate of useable traveler observations, the factor of 20 percent was used (see paragraph IV B above).

\* Numbers have been rounded; total is based on unrounded data.

Table 5

Railroad Route Mileage of the USSR Traveled by Western Observers  
Adjusted for Effective Coverage

25X1D

<u>Area</u>	<u>Total Miles</u>	<u>Traveled</u>		<u>Useable Percent</u>
		<u>Miles</u>	<u>Percent</u>	
USSR	75,900	25,700	34	7
Suitable for Deployment	75,400	25,100	33	7
Priority Areas				
Total	46,000	16,940	37	7
Area 1	6,200	1,850	30	6
Area 2	8,300	2,700	33	7
Area 3	3,000	790	26	5
Areas 4-5	22,000	8,370	38	8
Area 6	4,000	2,020	50	10
Area 7	1,250	620	50	10
Area 8	1,250	590	47	9

V. Total Visual-TALENT Coverage

In order to get an appreciation of total useable visual and TALENT coverage of the various areas of the USSR during the period, a range of values is estimated; the lower end of the range reflects the useable TALENT coverage and the upper end includes the useable visual coverage with an allowance for possible duplication. These estimates are presented in Table 6.

Table 6

Useable Visual-TALENT Coverage of the USSR

<u>Area</u>	<u>Land Area (Percent)</u>	<u>Rail Route Mileage (Percent)</u>
USSR	7-8	12-18
Suitable for Deployment	14-15	12-18
Priority Areas		
Total	4-6	9-15
Area 1	2-3	10-15
Area 2	19-21	36-42
Area 3	2-4	11-16
Areas 4-5	0-5	0-3
Area 6	0-1	0-10
Area 7	0-1	0-10
Area 8	0-1	0-9

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